OKLAHOMA GAS & ELECTRIC
McCLAIN FACILITY
UIC CLASS I PERMIT RENEWAL APPLICATION
ATTACHMENT E – PLUGGING AND ABANDONMENT PLAN

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E. PLUGGING AND ABANDONMENT PLAN

The plugging and abandoning procedures for the injection well are designed to be used if the effluent disposal well operations are abandoned or if the well has reached the end of its useful life. The procedure for well closure is described below. Pursuant to 40 CFR 146.10 and Oklahoma Administrative Code, Subchapter 9 – §252:652-5-1(5), the injection well will be plugged in a manner that will prevent movement of fluids either into or between USDWs. If this condition occurs, the monitoring well will also be abandoned following approval by ODEQ.

OG&E will notify the ODEQ of intent to plug a well at least 180 days prior to closure. OG&E will also notify the ODEQ of the exact time when plugging operations will take place. The following information will be provided:

- Type and number of plugs;
- Placement of each plug, including the elevation of both the top and bottom of the plug;
- Type, grade, and quantity of the plugging material and additives to be used;
- Method used to place plugs in hole;
- Procedure used to plug and abandon each well; and
- Any information on newly constructed or discovered wells or additional well data within the AOR.

E.1 PLUGGING AND ABANDONMENT PROCEDURES FOR THE INJECTION WELL

Plugging for injection well closure is described below. Pursuant to 40 CFR 146.10 and Oklahoma Administrative Code, Subchapter 9 – §252:652-5-1(5), the well will be plugged in a manner that will prevent movement of fluids either into or between USDWs:

1. Record pressure decay in the injection zone for a time specified by DEQ.
2. Conduct annulus pressure test, temperature log and radioactive tracer survey.
3. If pressure exists at the wellhead, inject enough sodium chloride brine to insure that no pressure exists at the wellhead.
4. Prepare location for workover rig.
5. Move workover rig onto location.
6. Rig up workover rig. Install blowout preventers.
7. Remove the wellhead and install well control equipment.
8. Release packer. Pull out injection tubing string with packer.
9. Conduct a casing inspection survey and a cement bond/evaluation log if more than 5 years have passed since the last casing inspection.
10. Pick up enough joints of tubing work string to reach total depth at 6,796 feet (note: fill tagged at 6,796 feet, 5/2011).
11. Circulate well fluid.
12. Mix and pump 80 barrels of cement (1,074 feet in the 9-5/8”-43.5 lb. casing) from fill depth to 5,722 feet (above the top of the lower perforated interval).
13. Pull the end of the work string up to at least 5,000 feet and reverse-circulate to clean any residual cement out of the work string. Wait for the cement to harden for 4 hours.

14. Lower the end of the work string to the top of the first cement plug at approximately 5,722 feet. Set 3,000 lbs. of work string weight on the cement plug to confirm integrity of the cement plug.

15. Mix and pump a continuous plug, in 2,000-foot stages, to within 100 feet of the surface. Pull work string up out of the cement plug and reverse circulate the work string after each stage. Tag the top of the cement between each stage to verify cement top and quality.

16. Mix and fill the remainder of the 8" casing with cement to 3 feet below the ground surface (bgs).

17. Cut off casing 3 feet bgs and weld steel plate on top.

18. Inscribe on plate the injection well number, location, dates of use, date of plugging, total volume injected, and owner of well.

19. Rig down and release rig.

20. A permanent marker will be erected at the well site. The marker will contain all pertinent well information (permit number, date of abandonment, and company name).

Figure E-1 is a schematic of the well plugging plan. A plugging report will be filed with ODEQ within 30 days after completion of plugging.

E.2 PLUGGING AND ABANDONMENT PROCEDURES FOR THE MONITORING WELL

Plugging operations will be conducted as follows:

1. Prepare location for workover rig.
2. Move workover rig onto location.
3. Rig up workover rig.
4. Remove wellhead and submersible pump.
5. Run in hole with work string tubing to approximately 1,050 feet.
6. Pump approximately 500 cubic feet of 14.0 pound per gallon (ppg) cement from total depth to surface.
7. Pull tubing to 3 feet. Reverse-circulate to clean tubing.
8. Wait for cement to set for 6 hours.
9. Cut surface casing 3 feet below grade level.
10. Run in hole to tag cement plug.
11. Top-off cement and weld cover on surface casing stick-up.
12. Rig down and release rig.
13. Inscribe on plate the monitoring well number, location, dates of use, date of plugging, and owner of well.
14. A permanent marker will be erected at the well site. The marker will contain all pertinent well information (permit number, date of abandonment, and company name).

Figure E-2 is a diagram of the monitoring well plugging plan. A plugging report will be filed with ODEQ and OWRB within 30 days after completion of plugging.

E.3 POST-CLOSURE PLAN

Upon closure of the injection well, OG&E will submit a survey plat to the local zoning authority that will indicate the location of the injection well relative to permanently surveyed benchmarks. The facility will also submit a copy of the plat and provide information necessary to impose appropriate conditions on subsequent drilling activities that may penetrate the well's confining or injection zone. OG&E will retain records reflecting the nature, composition, and volume of all injected fluids for a period of 5 years following plugging and abandonment.